

JAUNDICE

By: Ahmed Rashad Mashaal

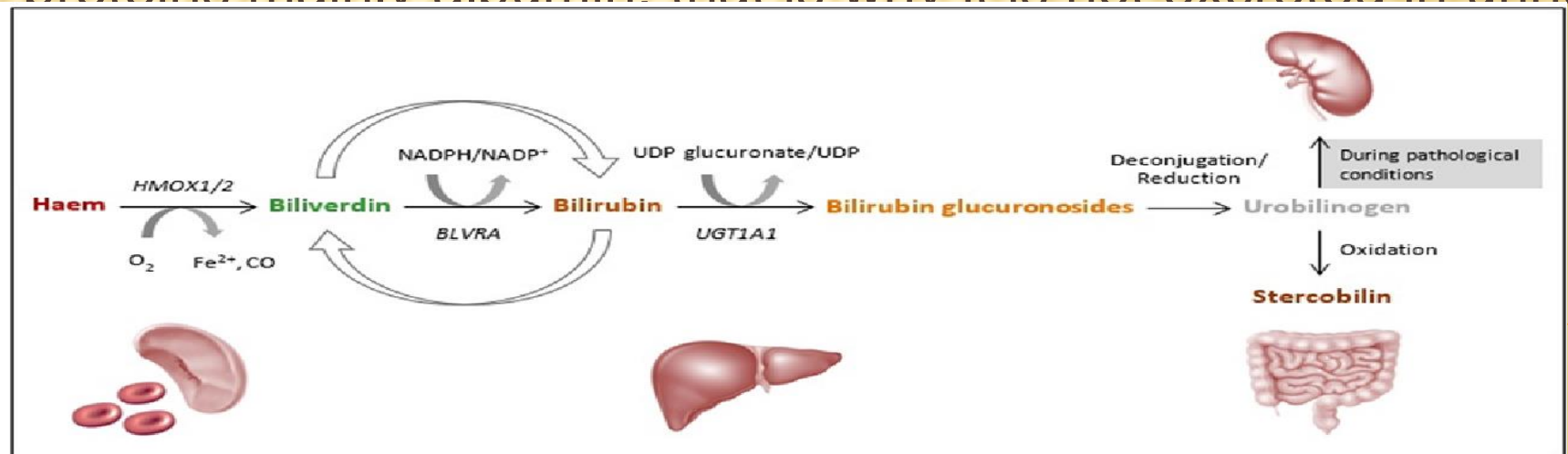
DEFINITION

- ✗ Jaundice is yellowish discoloration of the sclera, skin and mucous membranes due to increased levels of serum bilirubin.
- ✗ Normal serum total bilirubin 0.2 – 1.0 mg/dl.
- ✗ Jaundice is clinically significant when total bilirubin exceeds 3.0 mg/dl.



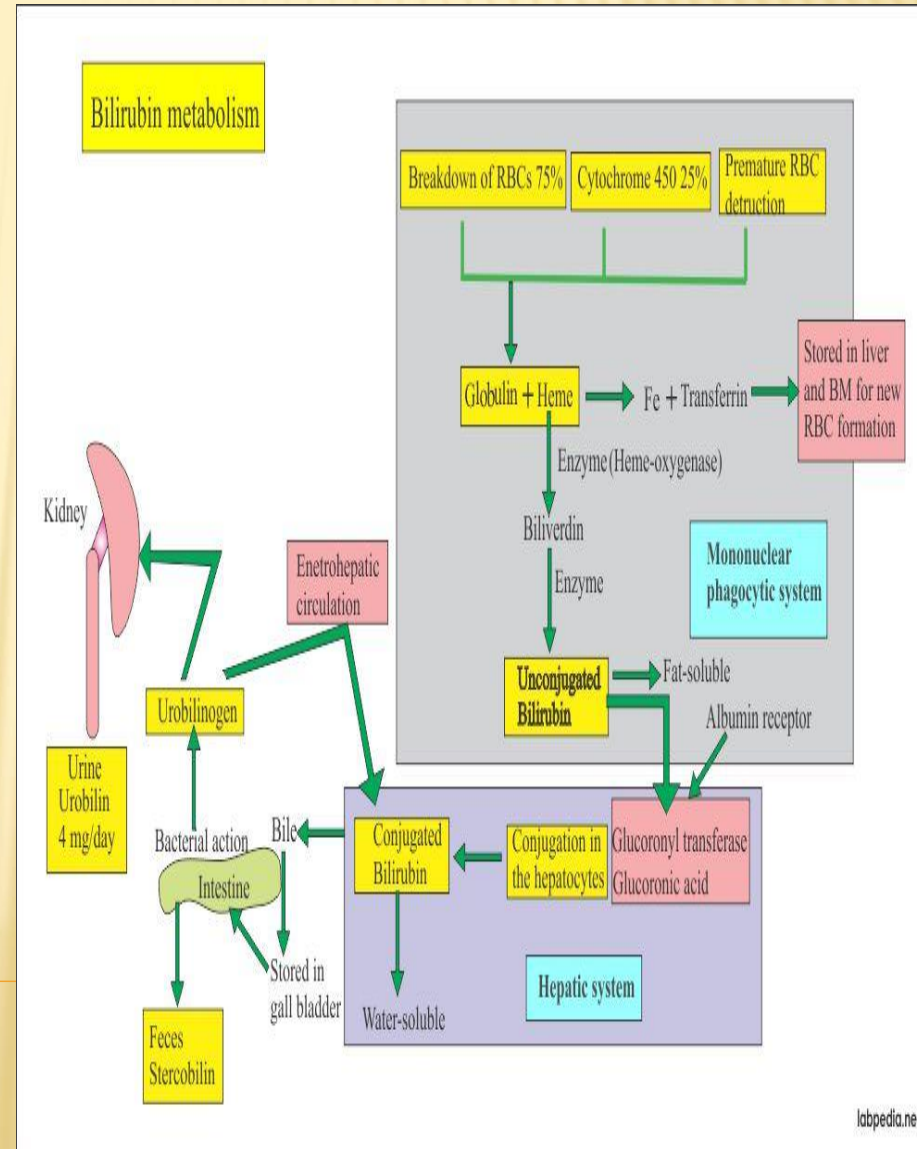
PHYSIOLOGY OF BILE PIGMENT METABOLISM 1

1. The old red blood cells (RBCs) are destroyed in the reticulo-endothelial system (spleen).
2. Haemoglobin is catabolised into Haem + globin (protein portion).
3. Heme is enzymatically (by haem oxygenase) converted to biliverdin which is reduced to bilirubin. This bilirubin is unconjugated and it is water insoluble and bound to plasma proteins mainly albumin. that is why it is not excreted in urine.

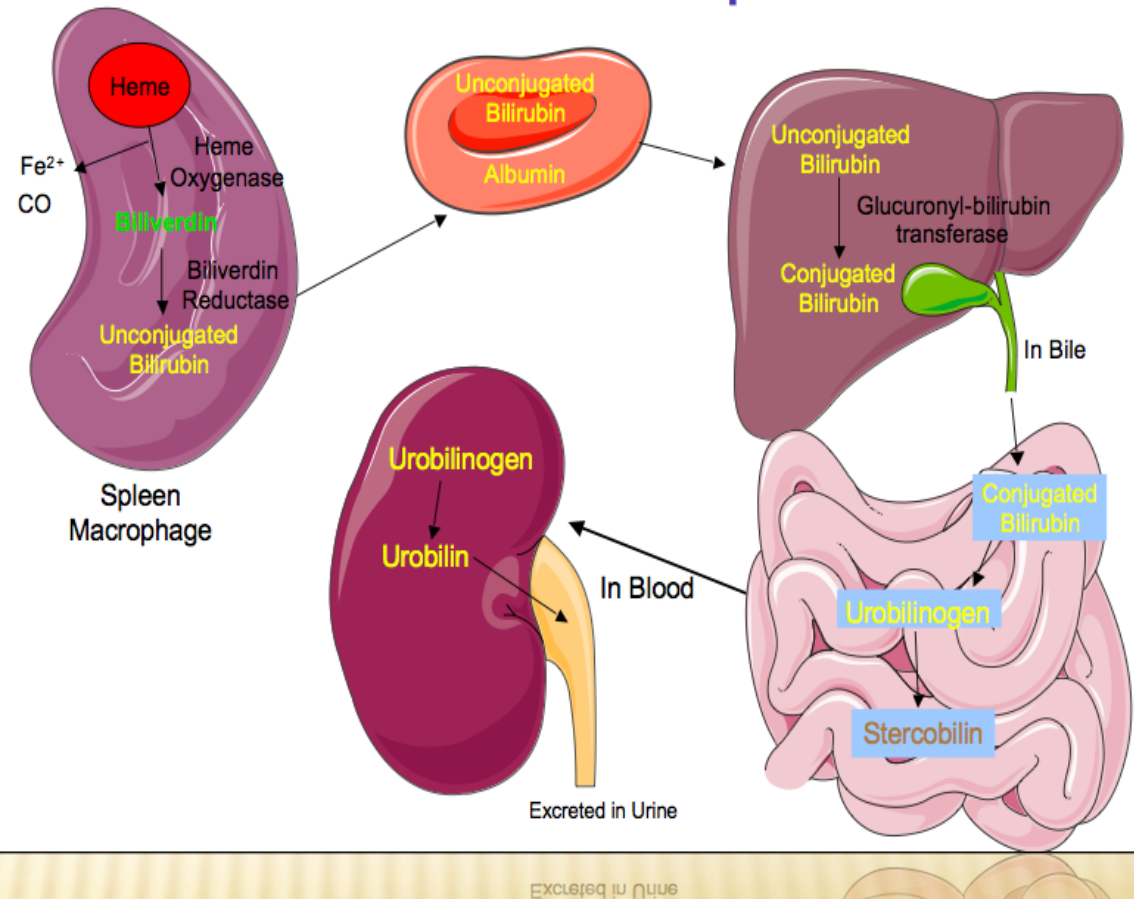


PHYSIOLOGY OF BILE PIGMENT METABOLISM 2

4. Uptake of bilirubin by hepatocytes is followed by its conjugation to glucuronic acid where it becomes conjugated bilirubin which is water soluble and so it can be excreted in bile.
5. In the intestine it is transformed into stercobilinogen and most of it excreted in the stool giving its dark color.
6. At the terminal ileum small amount are reabsorbed and pass into portal circulation back to the liver to be re-excreted (entero-hepatic circulation).
7. Some escape into systemic circulation and as it is water soluble it can be excreted in urine as urobilinogen.



Bilirubin Transport



Haem bilirubin
= unconjugated bilirubin
= indirect bilirubin

Cholebilirubin
= conjugated bilirubin
= direct bilirubin

CAUSES OF JAUNDICE

Jaundice

Pre hepatic causes

- Mainly due to hemolysis of RBCs as in hemolytic anaemia.
- Resulting in the formation of excessive amount of haemobilirubin (unconjugated).
- Being water insoluble, it cannot be filtered by the kidneys or excreted in the urine.

Hepatic causes

- Liver cell damage affects its ability for 1) ability of haemobilirubin uptake. 2) conjugated bilirubin as well is not able to be secreted in bile.
- The conjugated bilirubin is filtered by the kidneys resulting in slightly dark urine color.

Cholestatic causes

- There is obstruction to the outflow of bile at any point from the liver cells down to duodenum.
- The conjugated bilirubin will regurgitate into the blood → being water soluble will be filtered by kidneys → dark urine.
- The stool is bulky

1- PREHEPATIC (HEMOLYTIC) JAUNDICE CAUSES

✗ The most common causes of pre-hepatic jaundice are:

- 1- **Malaria**: a blood infection caused by a parasite
- 2- **Sickle cell anemia**: a genetic condition in which red blood cells become crescent-shaped rather than the typical disc shape.
- 3- **Spherocytosis**: a genetic condition of the red blood cell membrane that causes them to be sphere-shaped rather than disc-shaped
- 4- **Thalassemia**: a genetic condition that causes your body to make an abnormal form of hemoglobin that reduce the RBCs lifespan.
- 5- **Autoimmune hemolytic anemia (AIHA)**: in which autoantibodies react with self red blood cells and cause their destruction.
- 6- Haemolysis secondary to **drug toxicity** or **transfusion reaction**.
- 7- **Erythroblastosis fetalis**

1- PREHEPATIC (HEMOLYTIC) JAUNDICE CONT

CLINICAL PICTURE

- ✗ The patient is usually a child or young adult. They give history of repeated transfusion.
- ✗ Jaundice: Lemon yellow.
- ✗ Pallor: due to anaemia.
- ✗ Splenomegaly: site of hemolysis.
- ✗ Normal urine color (if freshly voided).

N.B.

The excess conjugated bilirubin excreted by the liver is converted in the intestine to excess stercobilin in stools and excess urobilinogen. Absorbed urobilinogen is excreted in urine and on standing will be oxidized to urobilin which makes the urine dark in color

INVESTIGATIONS

- ✗ Blood picture:
 - 1- anemia.
 - 2- Reticulocytosis: immature RBCs
- ✗ Chemisty:
 - 1- Bilirubin: increased indirect bilirubin – normal direct bilirubin.
 - 2- Normal liver enzymes.
 - 3- Normal Alkaline phosphatase.
- ✗ Urine analysis:

Bilirubin is absent
Normal color when freshly voided, later on → dark urine.
- ✗ Stool analysis: Normal or dark color.

2- HEPATOCELLULAR JAUNDICE

❑ Causes:

- 1- All causes of acute hepatitis (viral hepatitis on the top causes).
- 2- All causes of chronic liver injury & liver cirrhosis.
- 3- Drugs e.g. Paracetamol, alcohol, halothane.
- 4- Hepatic malignancy.

- ❑ The diseased liver has a decreased ability to uptake haemobilirubin or to secrete the conjugated bilirubuin as well in the bile. Both types of bilirubin are increased in the blood.
- ❑ The conjugated bilirubin is filtered by the kidney resulting in dark coloration of urine.

2- HEPATOCELLULAR JAUNDICE CONT

CLINICAL PICTURE

- ✗ Moderate jaundice and the color is orange yellow.
- ✗ Features of the cause: as seen in chronic liver cell failure: ascites, edema, bleeding tendency, portal hypertension, hepatomegaly, splenomegaly.
- ✗ Urine is slightly dark with urobilin and direct bilirubin.
- ✗ Stools are slightly light in color.

INVESTIGATIONS

- ✗ Blood picture:
 - 1- anemia.
 - 2- thrombocytopenia
- ✗ Chemistry:
 - 1- Bilirubin: increased indirect bilirubin – increased direct bilirubin.
 - 2- elevated liver enzymes.
 - 3- Normal Alkaline phosphatase.
 - 4- decreased albumin, prolonged prothrombin time and elevated INR.
- ✗ Urine analysis:

Bilirubin is slightly present.
Slightly dark.
- ✗ Stool analysis: Normal or slightly pale color.

3- CHOLESTATIC (OBSTRUCTIVE) JAUNDICE

- ✗ There is obstruction to outflow of bile from the liver cells where the bilirubin is conjugated till it enters the duodenum.
- ✗ The bile containing the conjugated bilirubin stagnates in the dilated bile ducts and regurgitates in the blood. The conjugated bilirubin is excreted by the kidneys.
- ✗ Since bile does not reach the intestine, stercobilinogen is absent and consequently no stercobilin in stools and no urobilinogen in urine.

3- CHOLESTATIC (OBSTRUCTIVE) JAUNDICE CONT

Causes:

A- Intrahepatic:

- Primary biliary cirrhosis.
- Intrahepatic malignancy.

B- Extrahepatic (most important):

- Bile duct stones.
- Tumors of bile ducts (cholangiocarcinoma).
- Benign stricture in bile duct (e.g. primary sclerosing cholangitis).
- Pressure on the bile ducts by enlarged lymph node or cancer in pancreas

3- CHOLESTATIC (OBSTRUCTIVE) JAUNDICE CONT

CLINICAL PICTURE

- ✗ The age is usually middle or old age.
- ✗ Severe deep jaundice and the skin is olive yellow.
- ✗ Abdominal pain is common (stone/malignancy).
- ✗ The stools are clay like and pale due to the absence of stercobilin
- ✗ The urine is dark brown due to presence of bilirubin (conjugated) / Absence of urobilinogen in urine.
- ✗ Sever itching (pruritus) due to retention of bile salts
- ✗ Bradycardia is sometimes found due to effect of bile salts on vagus.
- ✗ Impairment absorption of fat- soluble vitamins as vitamin K. This leads to tendency for bleeding due to decreased synthesis of factors II, VII, IX and X.
- ✗ Steatorrhea (fatty diarrhea) due to malabsorption of fats. Stools are offensive and cannot be flushed.

INVESTIGATIONS

- ✗ Blood picture: no role.
- ✗ Chemistry:
 - 1- Bilirubin: normal indirect bilirubin – increased direct bilirubin.
 - 2- liver enzymes: may be elevated..
 - 3- Increased Alkaline phosphatase.
 - 4- Elevated INR
- ✗ Urine analysis:

Tea colored (deep brown) due to elevated direct bilirubin.

Urobilinogen is absent.
- ✗ Stool analysis: clay color – steatorrhea.
- ✗ Abdominal ultrasound, C.T., ERCP and laparoscopic cholecystectomy

GILBERT'S SYNDROME

- ✗ It is the most common familial hyperbilirubinemia.
- ✗ It affects about 5% of the population and needs only reassurance.
- ✗ It is due to a defect in uptake of haembilirubin by hepatocytes.
- ✗ Its usually detected as an incidental finding of a slightly raised bilirubin on a routine check.
- ✗ All other liver biochemistry is normal and no signs of liver disease.
- ✗ The raised unconjugated bilirubin rises on fasting and mild illness e.g. influenza. Reticulocytes are normal (to exclude hemolysis).

CRIGLER-NAJJAR SYNDROME

- ✗ It is a rare familial disorder caused by either the absence (type I autosomal recessive) or decreased (type II autosomal dominant) of glucoronyl transferase, the enzyme responsible for bilirubin conjugation in hepatocytes.
- ✗ Only type II can survive to adult life.
- ✗ Liver histology is normal.
- ✗ Transplantation is the only effective treatment.

SPECIAL FORMS OF JAUNDICE

Before any dental procedure for jaundiced or cirrhotic patient , dentists should check prothrombin time. If it is prolonged > 3 seconds than the control, there is increased risk of bleeding and medical consultation is needed.

THANK YOU